

Operable Unit 3: Off-Site Releases

Soils

Introduction

The areas near the Rocky Flats Plant (RFP) known as Operable Unit 3" (OU3 Off-Site Releases) include soils and reservoir sediments that may have been contaminated by releases from RFP primarily plutonium and its daughter product, americium. The "individual hazardous substance sites" (IHSSs) within OU3 are defined as follows:

- o IHSS 199 Contamination of the Land's Surface
- o IHSS 200 Great Western Reservoir
- o IHSS 201 Standley Reservoir
- o IHSS 202 Mower Reservoir

The U S Department of Energy (DOE) recently issued the Final Past Remedy Report, which discusses IHSS 199. A companion document about IHSS 200-202, Historical Information Summary and Preliminary Health Risk Assessment, has also been issued. Both reports describe actions RFP took in response to requirements set forth in the Interagency Agreement. The two documents are available for public examination in the reading rooms listed on page 3 of this fact sheet.

This fact sheet focuses on IHSS 199, and, in particular, remediation of about 350 acres of land that were the subject of a legal agreement.

Soil Studies

As summarized in the Remedy Report, preliminary studies of the land near RFP have shown that soils in some areas contain plutonium and americium at levels

higher than what can be attributed to worldwide fallout from nuclear weapons testing. In attempting to identify the source of this contamination, these studies focused on airborne emissions from RFP, with emphasis on three possible sources: a September 1957 fire in Building 771, a May 1969 fire in Building 776, and plutonium-contaminated soils at and around the 903 Pad. The 903 Pad is a former waste-drum storage area east of the main production area. (See map on page 4.)

The historical studies concluded that most of the plutonium in off-site soils was deposited by dust blown from the 903 Pad. Although data from the older studies are useful for characterizing the site and providing a qualitative risk assessment, they do not meet current U S Environmental Protection Agency (EPA) requirements for conducting a baseline risk assessment covering human health and the environment. Further studies being conducted at OU2, which includes the 903 Pad, are expected to provide more detailed information about soil contamination between the 903 Pad and the eastern boundary of RFP.

To prevent further spreading of plutonium-contaminated dust, the 903 Pad was capped with asphalt in November 1969. In 1975, an off-site air monitoring system was established. Data from this system plus on- and off-site soil monitoring data indicate that off-site soils have not been measurably affected by plutonium from RFP since the air monitoring system was begun. Because the exposure pathway analysis in the Remedy Report suggests that inhalation of airborne dust is the most significant pathway for human exposure, IHSS 199 does not appear to pose an immediate human health

hazard from plutonium. However, as noted above, data quality deficiencies restrict this assessment to being preliminary in nature.

While there have been numerous studies of plutonium in off-site soils, not much data exist for non-plutonium contaminants that could affect off-site soils as a result of RFP releases. A RFP study in 1976 and 1977 included soil testing in an area east of the plant, as well as five locations remote from the plant, for a variety of radioactive isotopes. Analysis of the samples indicated that levels of radionuclides other than plutonium and americium on near-plant land were similar to those of soils at far-away locations. Also, the 1971 Colorado Department of Health's measurements of beryllium--a nonradioactive metal--in soils close to the plant revealed that concentrations were consistent with expected background levels. The Colorado Department of Health conducted further sampling for beryllium in 1989 and found no values at or above the method detection limit. Investigation of other potential contaminants will be considered in the future.

The Remedy Acreage

Part of IHSS 199 consists of 350 acres of land east of the plant known as "the remedy acreage" (see map). The "remedy" was prescribed as a result of a 1975 lawsuit filed against Rockwell International Corporation, Dow Chemical Company, and the United States of America by the Church (McKay) plaintiffs and Great Western Venture partnership. The plaintiffs alleged that approximately 2,000 acres of their land to the west, south, and east of RFP had been damaged by plutonium and other radioactive releases from RFP. The releases, it was claimed, had made the land unfit for human habitation and lessened the market value for commercial, residential or other non-agricultural uses.

The parties agreed to have soil samples collected and analyzed for plutonium, and they decided upon specific methodologies before the investigation began. Sampling and analysis, conducted from 1977 to 1979, revealed plutonium concentrations ranging from less than 0.01 to 3.4 picocuries per gram (pCi/g)

of soil. There is no federal standard for plutonium in soil, but the Colorado Department of Health's "special construction requirements standard" is 0.9 pCi/g. This standard is stricter than EPA's guidance (8 to 20 pCi/g) for concentration of total transuranic elements in soil. (Transuranic elements are those having atomic numbers higher than 92. They include, but are not limited to, plutonium.)

In December 1984 the plaintiffs and defendants reached a settlement, the Settlement Agreement (as amended in July 1985) calls for ripping, plowing and tilling affected soils to bring the plutonium concentrations below the CDH special standard. The agreement requires RFP to verify remedy effectiveness through additional soil sampling, and to revegetate the tilled soils. If any further releases of plutonium occur, RFP must demonstrate that soils on affected properties do not exceed applicable standards. Another provision requires RFP to issue semi-annual status reports on remediation progress.

Approximately 350 acres of the holdings were designated for remediation because their plutonium-in-soil concentrations exceeded the CDH special standard. As part of the Settlement Agreement, about 250 acres of this land were transferred to Jefferson County for use in its Open Space program, and about 100 acres were transferred to the City of Broomfield for future expansion of Great Western Reservoir. Although approximately 100 to 110 acres of the Jefferson County land has been remediated, the county does not plan to allow public access until all of the affected acreage is remediated. Broomfield has not yet requested that remediation begin on its portion of the land, which also is closed to the public.

Remediation Achievements and Problems

The Settlement Agreement specifies the following remedial actions, subject to modification by agreement between the owner and RFP:

- o Spring plowing and tilling, followed by planting of a summer cover crop

- o Drilling grass seed into cover crop stubble in the fall
- o Supplemental mulching in areas where the cover crop is insufficient to protect the soil
- o Irrigation while the grass seed is being established
- o Weed control, if necessary

About 100 to 110 acres of Jefferson County's remedy acreage have been tilled and revegetated. The tilling appears to have successfully reduced soil plutonium concentrations to below the CDH special standard. However, revegetation to stabilize the tilled soils has produced mixed results due to insufficient amounts or timing of precipitation, excessive weed growth, prairie dog activity, clayey soils or rocky surfaces and rapid soil drying on steep, exposed slopes.

To improve the chances for successful revegetation, a January 1991 remedy status report proposed the following actions:

- o Weed control
- o Prairie dog control
- o Change of seed mixture

Soil samples from both tilled and untilled Jefferson County remedy acreage were collected in January 1991. The samples will be analyzed for plutonium and americium.

Future Use of the Remedy Land

Neither Jefferson County nor the City of Broomfield has determined the post-remedy use(s) of their land. Possible future uses for the land will be examined as part of the upcoming remedial investigation.

For more information about OU3 contact

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Information Repositories

Rocky Flats Public Reading Room
Front Range Community College Library
3645 West 112th Avenue
Westminster CO 80030
303-469-4435

Hours	M T	12 00 pm	8 00 pm
	W	10 00 am	4 00 pm
	Th F	9 00 am	4 00 pm

Rocky Flats Environmental Monitoring Council
1536 Cole Boulevard Suite 325
Denver West Office Building 4
Golden, CO 80401
303 232 1966

Hours M F 8 30 am 5 00 pm

EPA Superfund Records Center
999 18th Street Suite 500
Denver CO 80202
303 293 1807

Hours M F 7 30 am 4 30 pm

Colorado Department of Health
Hazardous Materials and Waste
Management Division
4210 East 11th Avenue Room 351
Denver CO 80220
303 331 6733

Hours M F 8 00 am 5 00 pm

U S Department of Energy HQ
FOI and Privacy Branch
AD234 1 1G 051/FORS
1000 Independence Ave S W
Washington DC 20585
202 586 6025

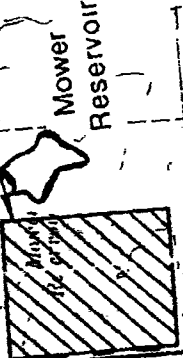
Hours M F 9 00 am 4 00 pm
(Eastern Time)



ROCKY FLATS PLANT
Buildings on East Side



Remedy Acreage



ROCKY FLATS BOUNDARY

**JEFFERSON COUNTY
ACREAGE**

**CITY OF BROOMFIELD
ACREAGE**

